

**OPERATIONS AND MAINTENANCE PLAN
TOURTELOT CLEANUP PROJECT
Benicia, California**

June, 2004

**Lead Agency:
California Environmental Protection Agency
Department of Toxic Substances Control
Sacramento, California**

**Prepared on behalf of
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1.0 PLAN PURPOSE AND OVERVIEW

This Operations and Maintenance Plan (O&M Plan) has been prepared on behalf of Pacific Bay Homes, LLC (PBH), Granite Management Corporation and FN Projects, Inc., as required by the Final Remedial Action Plan Tourtelot Cleanup Project, Benicia, California (EarthTech, Inc., September 2001) (RAP) approved by the Department of Toxic Substances Control for the Tourtelot Cleanup Project, Benicia, California (Project Site). The O&M activities required by the O&M Plan are designed to monitor and maintain the effectiveness of the remedial actions at the Project Site.

The O&M Plan is to be incorporated into and implemented in accordance with the terms of the Operations and Maintenance Agreement (O&M Agreement) required by Section 5.14 of the Imminent and/or Substantial Endangerment Determination and Remedial Action Order (Docket No. I/SE 98/99-011) signed June 1, 1999 (Order), issued for the Project Site by the California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC).

The parties to the O&M Agreement include DTSC, the City of Benicia, Granite Management Corporation, FN Projects, Inc. and Pacific Bay Homes,. Each of Granite Management Corporation, FN Projects, Inc. and Pacific Bay Homes is named as a respondent to the Order. The United States Army Corps of Engineers (USACE) is also named as a respondent to the Order. USACE is not a party to the O&M Agreement, but has confirmed to the City of Benicia that it will assist the City in developing the educational materials required to implement the public awareness programs described in Section 3.7 of this O&M Plan.

The City of Benicia currently owns a portion of the open space property included in the Project Site that will be subject to post-remediation operations and maintenance activities under the O&M Plan and Agreement. PBH currently owns the remainder of the property at the Project Site that will be subject to such post-remediation operations and maintenance activities. The property owned by PBH includes property zoned for future residential development as well as property that will remain open space. Future residential areas of the Project Site have been cleaned up to a standard allowing unrestricted use and will not be subject to institutional controls, but the open space areas of the Project Site will be subject to such controls. The institutional controls are described in Section 2.5 of this O&M Plan. The City of Benicia has agreed to accept title to the open space parcels currently owned by PBH following completion of the cleanup activities at the Project Site and certification by the DTSC that remediation is complete at the Project Site and no further removal action/remediation is necessary.

2.0 BACKGROUND INFORMATION

2.1 PROJECT SITE

1 The Project Site is located in the City of Benicia, Solano County, California (Figure 1-1)
2 and includes approximately 220 acres. The Project Site boundary and key features of the
3 Site are shown in Figure 1-2. Future land use at the Project Site is shown on Figure 1-3.
4

5 On September 12, 2003, DTSC determined that no further remedial action is required for
6 a portion of the Project Site known as the D-1 Parcel. (See Figure 1-3 for location of the
7 D-1 Parcel.)¹ Following that determination, PBH transferred ownership of the residential
8 areas in the D-1 Parcel to an unrelated third party. Construction of eighty-one single
9 family residences is currently underway on the D-1 Parcel.
10

11 The City of Benicia currently owns the open space parcels within the D-1 Parcel. PBH
12 currently retains ownership of the streets in the D-1 Parcel. The City of Benicia has
13 agreed to accept PBH's dedication to the City of the ownership of the streets in the D-1
14 Parcel, subject to final approval by the Public Works Director as to the condition of the
15 streets and related subdivision improvements and confirmation that they comply with the
16 requirements of the City's Subdivision Improvement Agreements relating thereto.
17

18 **2.2 HISTORICAL BACKGROUND**

19

20 From 1849 to 1964 the United States Army operated the former Benicia Arsenal in
21 Benicia, Solano County, California. Between 1944 and 1960, the Army leased
22 approximately 200 acres of undeveloped grassland comprising a portion of the Project
23 Site and operated the area as part of the Benicia Arsenal. The Army conducted several
24 arsenal-related activities on the Tourtelot Property, including artillery testing,
25 demilitarization and demolition of damaged and obsolete munitions.
26

27 After the Benicia Arsenal was closed in 1964, the Tourtelot Property changed ownership,
28 and plans for private residential development were initiated. In 1996 during preliminary
29 development activities on the Project Site, concrete-filled howitzer shells and live
30 ordnance were discovered on the Project Site. This finding prompted FN Projects Inc.
31 (which then owned the Tourtelot Property), its parent company Granite Management
32 Corporation and USACE to begin characterizing the site for ordnance and explosives
33 (OE) and chemical impacts to soil and groundwater. In June 1999, DTSC issued the
34 Order and assumed regulatory authority over the investigation and remediation of the
35 Project Site.
36

37 In a separate project, the USACE has conducted investigative and remedial activities to

¹The Project Site encompasses a portion of the area identified as "Unit D-1" in the Final Subdivision Map entitled "Southampton Unit D-1, Benicia, Solano County, California," filed in the Office of the Recorder, County of Solano, State of California on September 17, 1991, in Book 61 of Maps at Page 23. The portions of Unit D-1 that are within the Project Site are referred to in this O&M Plan as the "D-1 Parcel".

1 locate and remove OE and metal fragments free of explosive residue remaining after
2 demolition of OE items (OE Scrap) and address chemical impacts in other areas of the
3 former Benicia Arsenal, including an area adjacent to the Project Site which has been
4 designated as Sector 2 of the USACE's Former Benicia Arsenal project. (USACE Sector
5 2 is sometimes referred to in Tourtelot project documents as the Gonsalves Property.)
6 The location of Sector 2 is shown on Figure 1-2. Additionally, at the request of DTSC,
7 PBH performed a quality assurance action (QA Action) on portions of USACE Sector 2.
8 The QA Action consisted of vegetation removal, debris removal, real-time geophysical
9 scanning, investigation of metallic anomalies and disposal of one OE item and OE Scrap.

11 **2.3 REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY**

13 Following the issuance of the Order, remedial investigations were conducted and
14 remediation alternatives were evaluated to determine the preferred alternatives for
15 remediating OE and chemically affected soil and to address surface water and
16 groundwater at the Project Site. The remedial investigation and feasibility study of
17 remediation alternatives are described in the Final Remedial Investigation/Feasibility
18 Study, Tourtelot Cleanup Project, Benicia, California (EarthTech, July 2001) (RI/FS),
19 which was approved by DTSC in August, 2001.

21 **2.4 REMEDIAL ACTION PLAN'S REMEDIAL ALTERNATIVE**

23 In January 2002, DTSC approved the RAP, which selected the remediation alternative for
24 the Project Site. The approved alternative requires OE point clearance of the entire
25 Project Site; areawide OE clearance in future residential areas of the Project Site
26 suspected of having the potential to contain OE after completion of point clearance, as
27 well as excavation and removal of overburden soil under residential property within 14
28 vertical feet of finished grade. OE point clearance includes locating, excavating,
29 identifying and disposing of recovered subsurface items which may include OE, OE
30 Scrap and non-OE metallic debris. Areawide OE clearance involves the excavation and
31 removal of soil in lifts accompanied by geophysical scanning and digging of anomalies as
32 an additional step to locate and remove any OE in future residential areas.

34 In conducting OE point clearance, it was determined that in certain areas of the Project
35 Site (representing approximately 10% of the Project Site), high densities of metallic
36 anomalies inhibited the effective clearance of OE using the geophysical scanning and in-
37 place point clearance techniques. In July 2003, DTSC approved the use of mechanical
38 excavation of uncleared soils in such areas so the soils could be relocated to another area
39 on the Project Site for OE clearance, either by mechanically sifting the soils using a
40 mechanical screening apparatus or by spreading the soils for scanning and digging of
41 anomalies.

43 The DTSC's approved remedial alternative also requires excavation and disposal of
44 chemically affected soils above final remedial goals, which are to be based on DTSC

1 approved human health and ecological risk assessments; installation of a layer of OE free
2 fill materials over areawide clearance soils in future residential areas and institutional
3 controls and monitoring. Finally, the approved remedial alternative calls for treatment by
4 homogenization of soils in the TNT strips (the locations of which are shown on Figure 1-
5 2), potentially containing TNT concentrations greater than 10 percent to levels acceptable
6 for off-site transport and disposal. The required remedial activities are more fully
7 described in the RAP.

8 9 **2.5 INSTITUTIONAL CONTROLS**

10
11 Under the DTSC approved remedial plan for the Project Site, nonresidential areas of the
12 Project Site have undergone OE point clearance or have been cleared of OE using
13 mechanical excavation of soils followed by mechanical sifting or spreading for scanning
14 and digging of anomalies. Areawide clearance and installation of the OE free layer of fill
15 materials has been implemented in residential areas having a potential after point
16 clearance to contain OE. Areawide clearance and installation of the OE free layer of fill
17 materials are intended to eliminate any potential pathway for exposure to OE, if present.

18
19 To further reduce any potential for exposure to OE in the nonresidential areas, the RAP
20 required that institutional controls be applied to open space areas and to certain portions
21 of the Project Site that had been paved prior to discovery of OE items at the Project Site
22 (Restricted Areas). The institutional controls prohibit residential and certain other
23 specified land uses in the open space portions of the Restricted Areas and impose safety
24 controls on any future excavation activities in the Restricted Areas.

25
26 The institutional controls for the Project Site are set out in this O&M Plan and in three
27 related documents which include a Covenant to Restrict Use of Property, a Contingency
28 Action Plan and the O&M Agreement, each of which is briefly described below.

29 30 **2.5.1 Covenant to Restrict Use of Property**

31
32 Land use restrictions on open space portions of the Project Site and certain areas of the
33 Project Site that had been paved prior to initiation of cleanup activities are being
34 implemented through a Covenant to Restrict Use of Property (Covenant). A draft version
35 of the Covenant was made available for public review as an appendix in the Draft
36 Environmental Impact Report, Tourtelot Remediation/Cleanup Project, Benicia,
37 California (DTSC, September, 2001).

38
39 The Covenant provides that the open space parcels within the Tourtelot Project Site must
40 remain open space. The Covenant also prohibits certain land uses that would otherwise
41 be permitted in the open space under a special use permit from the City of Benicia,
42 including (by way of example) residential use or use as a hospital. These land use
43 restrictions are designed to prevent alternative uses of the open space that could be
44 incompatible with the level of OE clearance required by the RAP for areas not intended

1 for residential use. The Covenant's land use restrictions also apply to the open space
2 parcel that comprises a portion of the TNT strip location (see Figure 1-2). The TNT
3 remediation in such open space areas was based on cleanup standards appropriate for use
4 as open space and it is accordingly appropriate to prohibit alternative land use.
5

6 The Covenant also requires that special safety precautions be used for any Excavation
7 Activities in the Restricted Areas. ("Excavation Activities" are defined in Section 2.5.2
8 of this O&M Plan.) The safety measures for Excavation Activities are to be implemented
9 through the Contingency Action Plan discussed in Section 2.5.2.
10

11 In the draft form of the Covenant that was prepared in conjunction with the preparation of
12 the RAP and the Draft and Final Environmental Impact Reports (DTSC, December,
13 2001) (EIR) for the cleanup project, it was contemplated that the Restricted Areas would
14 include all areas of the Project Site with "open space" land use classification² and all of
15 the streets and other paved areas on the Project Site where paving had occurred prior to
16 the discovery of OE on the Project Site. Based on an assessment of the areas in which
17 OE items were located during remediation of the Project Site, some changes have been
18 made to the draft Covenant that was included in the EIR. (The assessment of the
19 distribution of OE items on the Project Site is set out in the Final Conceptual Site Model,
20 Tourtelot Cleanup Project, Benicia, California (Northgate, June, 2004) (Conceptual Site
21 Model).) The changes to the draft Covenant are briefly described in the balance of this
22 Section 2.5.1.
23

24 As more fully described in Section 2.8 below, DTSC has determined that it is not
25 probable that any OE items would be located (i) below streets and other paved areas
26 located in the cut areas of the Project Site or in (ii) areas in the open space parcels where
27 no OE items or OE Scrap were found during OE point clearance of the Project Site.
28 Accordingly, the draft Covenant that was included in the EIR has been revised and the
29 Contingency Action Plan written to provide that institutional controls imposing special
30 OE safety requirements for Excavation Activities are not required in those areas.
31

32 Additionally, as more fully described in Section 2.7 below, in the small fill area on the D-
33 1 Parcel where sidewalks or dry utility trenches (i.e., the trenches in which electrical,
34 telephone, cable television and similar lines are located) are located, fill underlying the
35 sidewalks and fill adjacent to dry utility trenches has been replaced with OE free fill to
36 eliminate the need for any institutional controls affecting the sidewalks or dry utility
37 trenches in the D-1 Parcel. Similarly, as described in Section 2.6, fill in the dry utility
38 trench across the portion of the McAllister Land Bridge that had been paved prior to

² The draft Covenant did not anticipate any institutional controls would apply to a park location in Unit D-7 which is zoned as Open Space and designated for Park use or for an Open Space access path in Unit D-6. The RAP requires that both of these areas would be remediated to a level that would permit unrestricted use, and such remediation has occurred.

1 discovery of OE on the Project Site (Currently Paved Land Bridge Road) has been
2 replaced. As also described in Section 2.6, on the portion of the McAllister Land Bridge
3 that had not been paved prior to discovery of OE on the Project Site, OE clearance has
4 been conducted in the location at which the dry utilities trench is to be installed.
5 Accordingly, the dry utility trenches on the McAllister Land Bridge will not require
6 institutional controls.

7
8 As also described in Section 2.6, on the portion of the McAllister Land Bridge that had
9 not been paved prior to discovery of OE on the Project Site, OE clearance has been
10 conducted to create a "wet utilities corridor" where water, sewer and storm water lines are
11 to be installed. Accordingly, it will not be necessary for the City of Benicia to use any
12 special OE related safety measures to perform routine maintenance on the water, sewer
13 and storm water lines. In such conditions, the wet utilities corridor will not be considered
14 an OE Construction Support Area. In the event of a rupture of the water line in the wet
15 utilities corridor, it may be necessary to treat the affected area as an OE Construction
16 Support Area. The water line in the wet utilities corridor is pressurized. If the water line
17 should rupture, it is possible that the pressurized water would erode the soil beneath the
18 depth of the cleared corridor. (As shown on Figure 2-2, the corridor is twelve feet deep.
19 The water line is five feet below ground surface at its greatest depth.) In the event of a
20 water line break that erodes the soil to a depth of twelve feet or more below the ground
21 surface, the eroded area ("Wet Utilities Blow-Out Area") will be treated as an OE
22 Construction Support Area. The sewer and storm water lines are not pressurized and use
23 gravity feed to drain. Accordingly, it is unlikely that a break in one of those lines would
24 displace sufficient soil to penetrate below the bottom of the cleared wet utilities corridor.
25 However, if a break in one of those lines should cause erosion at a depth of twelve feet or
26 more below the ground surface, the eroded area would also be considered a Wet Utilities
27 Blow-Out Area and would be treated as an OE Construction Support Area. (The area in
28 which wet utilities were installed on the portion of the Land Bridge that had been paved
29 prior to discovery of OE on the Project Site will also be treated as an OE Construction
30 Support Area.)

31
32 The final form of the Covenant to Restrict Use of Property includes a map showing all of
33 the Restricted Areas that are to be subject to institutional controls. A copy of the final
34 Covenant, including such map, is attached to the O&M Agreement as Exhibit 2.

35 36 **2.5.2 Contingency Action Plan**

37
38 The safety controls applicable to future Excavation Activities in the Restricted Areas are
39 set out in the Contingency Action Plan, Tourtelot Remediation/Cleanup Project, Benicia,
40 California (June, 2004). As used in the Covenant, the Contingency Action Plan and in
41 this O&M Plan, "Excavation Activities" means excavation or other ground-intrusive
42 activities in the Restricted Areas that would require any digging or other penetration of
43 the land surface that involves: (1) the displacement of 10 cubic feet or more of soil within
44 one foot of the surface on any portion of the Restricted Areas located in Open Space

1 Parcels, (2) any penetration to a depth greater than one foot on any portion of the
2 Restricted Areas located in Open Space Parcels or (3) any penetration beneath the
3 aggregate base that underlies the asphalt and concrete surfaces of the Currently Paved
4 Land Bridge Road or the Restricted D-1 Street Area (as defined in Section 2.7 of this
5 O&M Plan). A copy of Contingency Action Plan is attached as Exhibit 3 to the O&M
6 Agreement.
7

8 **2.5.3 O&M Plan and O&M Agreement**

9

10 The RAP provides that upon completion of OE point clearance, soil remediation and a
11 post-remediation risk assessment, institutional controls are to be finalized and final
12 monitoring requirements set out in an O&M Plan. This O&M Plan was prepared to
13 satisfy this RAP requirement and is to be incorporated into and implemented by the
14 O&M Agreement, as required by Section 5.14 of the Order.
15

16 **2.6 MCALLISTER DRIVE LAND BRIDGE MEASURES**

17

18 Prior to the discovery of OE items at the Project Site, approximately 200,000 cubic yards
19 of fill from the Ridge area of the Project Site had been placed across the South Valley to
20 construct the McAllister Drive Land Bridge. (For location of the Land Bridge, see Figure
21 2-1.) The conclusions of the Conceptual Site Model indicate that the Army conducted
22 OE disposal operations near and/or on the Ridge area and that OE items are present in the
23 fill materials derived from near surface soils used to construct the Land Bridge. The near
24 surface soils comprise a small portion of the fill used to construct the Land Bridge. The
25 bulk of the Land Bridge fill is bedrock excavated from the Ridge. Based on results of
26 geophysical mapping and OE removal activities on the Land Bridge, it has been
27 determined that the fill soils from the Ridge were spread in thin, horizontal layers
28 throughout the mass of the Land Bridge. Prior to OE clearance, soils potentially
29 containing OE and OE Scrap were accessible from the ground surface on the sides of the
30 Land Bridge in several locations on both its western and eastern slopes.
31

32 The sides of the Land Bridge have been subjected to OE point clearance. Additionally,
33 soils on the sides of the Land Bridge have been excavated to a depth of two feet to
34 remove the fill soils that contained OE or OE Scrap and the excavated materials have
35 been replaced with OE free fill. It has been determined, however, that it would not be
36 possible to remove all OE from the entire mass of the Land Bridge unless the Land
37 Bridge were to be removed in its entirety, which removal would be extremely costly and
38 could potentially be detrimental to the environment.
39

40 Based on these findings, it was determined that additional measures should be
41 implemented on the Land Bridge to minimize the potential for future exposure by the
42 public to any OE hazards that might be contained in the Land Bridge. The additional
43 measures included (i) replacement of fill in the "dry" utilities trench on the Land Bridge
44 (i.e., the trench in which electrical, telephone, cable TV and similar lines are installed) on

1 the portion of the Land Bridge that had been paved prior to discovery of OE on the
2 Project Site, (ii) clearance of a corridor for installation of dry utilities across the unpaved
3 portion of the Land Bridge, (iii) installation of a utilities corridor on the unpaved across
4 the Land Bridge where "wet" utilities (i.e., sewer, water and storm water lines) are
5 planned to be installed in the future and (iv) installation of a physical barrier over the
6 unpaved surface of the western and eastern slopes of the Land Bridge to restrict
7 unauthorized sub-surface access.

8 9 **2.6.1 Dry Utilities Trench**

10
11 Before OE items were discovered at the Project Site, a "Dry Utility Trench" had been
12 constructed across the paved portion of the Land Bridge as a location for electrical,
13 telephone, cable television and similar lines to service residences planned for the areas of
14 the Project Site designated as Units D-6 and D-7. The utility lines were embedded in
15 sand in the Dry Utility Trench, which sand was covered with 2 to 2 1/2 feet of fill. The
16 sand fill was imported from offsite and would accordingly be free of OE. However, since
17 the fill materials covering the sand layer may have been derived from the Landbridge,
18 the covering fill materials could potentially have contained OE. Accordingly, all fill
19 materials above the sand layer in the Dry Utility Trench have been excavated and
20 removed to reach the sand level of the trench and the Dry Utility Trench was backfilled
21 with OE free fill materials.

22
23 The Dry Utilities Trench has been extended across the remainder of the Land Bridge (the
24 unpaved portion). As shown on the cross-section depicted on Figure 2-2, the Dry
25 Utilities Trench is located under and adjacent to the area where a sidewalk is to be
26 installed on the east side of the McAllister Land Bridge. The Trench extends to the east
27 side of the sidewalk location for a distance of about two feet and the Trench is
28 approximately five feet deep.

29
30 The location of the Dry Utility Trench on both the paved and unpaved portions of the
31 Land Bridge is shown on Figure 2-1 to this O&M Plan. As a result of the remedial steps
32 described above, the Dry Utility Trench will not be subject to the institutional controls.

33 34 **2.6.2 Wet Utilities Corridor**

35
36 Before OE items were discovered at the Project Site, "wet" utilities (i.e., water, sewer and
37 storm water lines) were installed and street pavement was installed to construct
38 McAllister Drive to about midway across the Land Bridge. Because those utilities lines
39 may be located in soils containing OE, any future work on the wet utilities in such area
40 will require special safety precautions, as set forth in the Contingency Action Plan.

41
42 The wet utility lines are to be extended across the remainder of the Land Bridge to
43 service future residential areas in the area of the Project Site designated as Units D-6 and
44 D-7. These wet utility lines are to be installed within a trench that has been backfilled

1 with OE free soil/bedrock fill. The width of the trench has been designed to eliminate the
2 need to disturb the trench sidewalls, if future work on the wet utility lines would be
3 required. The location of the Wet Utilities Corridor is shown on Figure 2-1, and a cross-
4 section of the Corridor is shown in Figure 2-2. Brass pins have been affixed to the curb
5 face on both sides of McAllister Drive midway across the Land Bridge to mark the
6 location where the Wet Utilities Corridor begins. The brass pins will assist workers in
7 the field in identifying the Wet Utilities Corridor location.

8
9 As discussed in Section 2.5.1 of this O&M Plan, if a wet utility line in the wet utilities
10 corridor were to break, it is possible that soil would be eroded beneath the bottom of the
11 wet utilities corridor. In such circumstances, the Wet Utilities Blow-Out Area must be
12 treated as a OE Construction Support Area and the special safety precautions set forth in
13 the Contingency Action Plan for Excavation Activities in an OE Construction Support
14 Area would apply.

15 16 **2.6.3 Physical Barrier on Surface of Land Bridge**

17
18 To prevent unauthorized subsurface access on the Land Bridge, a wire mesh barrier
19 (Land Bridge Mesh Barrier) has been installed on the surface of the Land Bridge. The
20 location of the Land Bridge Mesh Barrier is shown on Figure 2-1.

21
22 The Land Bridge Mesh Barrier is constructed of 3 1/2 inch weave, 9 gauge Class four
23 galvanized steel (1.2 oz zinc coated). The mesh has been installed in vertical lengths
24 from the top to bottom of the sloped sides of the Land Bridge and has been secured using
25 14-inch long U-shaped stakes made of galvanized steel. The Land Bridge Mesh Barrier
26 is intended to prevent unauthorized excavation. It will allow vegetation to remain, thus,
27 providing both access denial and aesthetics. Section 3.3 of this O&M Plan requires
28 annual monitoring of the Land Bridge Mesh Barrier to confirm that it has not corroded
29 and to confirm that it remains securely staked to the Land Bridge slopes.

30 31 **2.7 ADDITIONAL REMEDIAL STEPS TO ELIMINATE INSTITUTIONAL** 32 **CONTROL FOR SIDEWALKS AND DRY UTILITY TRENCHES IN FILL** 33 **AREA OF D-1 PARCEL**

34
35 In the initial draft of the Covenant, it was contemplated that all of the paved areas within
36 the D-1 Parcel would require institutional controls. As described in Section 2.8, it is
37 highly unlikely that OE would be encountered below paved areas in the D-1 Parcel that
38 had been cut to bedrock during grading prior to installation of streets and other paving,
39 and no institutional controls are required for such paved areas.

40
41 The D-1 Parcel contains a small area where fill had been placed when the area was
42 graded. Before OE was found on the Project Site, streets, sidewalks and wet and dry
43 utilities had been installed in this fill area of the D-1 Parcel. When the initial Covenant
44 was prepared, it was expected that the fill would be left in place below the existing

1 pavement in the D-1 Parcel fill area and that institutional controls would be applied as a
2 measure to help ensure that any intrusive activities beneath the pavement were conducted
3 in a safe manner. To avoid the need for institutional controls affecting the D-1 Parcel
4 sidewalks and dry utility trench, additional remedial steps have been taken. The
5 sidewalks above the fill were removed and the underlying fill within four feet of finished
6 grade was excavated and replaced with OE free fill. New sidewalks were then installed.
7

8 The utility lines in the dry utility trench in the D-1 Parcel were embedded in sand, and the
9 sand was covered with 2 to 2 1/2 feet of fill. In the fill area of the D-1 Parcel, the
10 covering layer above the sand may have included fill soils that could potentially contain
11 OE items. (The sand itself was imported from offsite and should, accordingly, be OE
12 free.) To avoid the need for institutional controls affecting the dry utility trenches in the
13 fill area of the D-1 Parcel, the covering layer of fill in the utility trenches was removed to
14 expose the sand layer. New OE free fill was then placed above the sand layer. This
15 remedial step has eliminated the need to impose institutional controls on the dry utility
16 trenches in the D-1 Parcel.
17

18 Based on the foregoing, the only paved area in the D-1 Parcel that will require
19 institutional controls is a small portion of McAllister Drive (approximately 150 feet in
20 length) in which street pavement overlays fill soils (Restricted D-1 Street Area). The
21 Restricted D-1 Street Area is identified in Figure 2-3. The OE safety measures described
22 in the Contingency Action Plan impose restrictions on any Excavation Activities on the
23 paved street area in this Restricted D-1 Street Area. Brass pins have been affixed to the
24 curb face on both sides of McAllister Drive in the vicinity of 376 McAllister Drive
25 marking the beginning of the Restricted D-1 Street Area and on both sides of McAllister
26 Drive in the vicinity of 379 McAllister Drive to mark the end of the Restricted D-1 Street
27 Area.. The brass pins will assist workers in the field in identifying the location of the
28 Restricted D-1 Street Area requiring OE safety measures.
29

30 **2.8 ASSESSMENT OF APPROPRIATE INSTITUTIONAL CONTROLS FOR** 31 **RESTRICTED AREAS** 32

33 Section 2.8.1 discusses the findings that led to a determination that institutional controls
34 are not required in certain open space and paved areas that had earlier been identified as
35 possibly requiring institutional controls. Section 2.8.2 discusses certain open space areas
36 that are subject to land use and encroachment prohibitions only and section 2.8.3
37 discusses the remaining areas of open space and paved area of the Project Site that are to
38 be subject to land use and encroachment prohibitions, as well as to institutional controls
39 imposing special OE safety requirements for Excavation Activities.
40

41 **2.8.1 Areas Not Requiring Institutional Controls** 42

43 Institutional controls will not apply to (i) a park location in the area of the Project Site
44 designated on subdivision maps as Unit D-7, which is zoned as Open Space and

1 designated for park use or (ii) an Open Space access path in the area of the Project Site
2 designated on subdivision maps as Unit D-6. The RAP requires that both of these open
3 space areas be remediated to a level that would permit unrestricted use, and such
4 remediation has occurred
5

6 Institutional controls are also not required for paved areas of the D-1 Parcel that are in the
7 areas that had been cut to bedrock during grading and the paved portion of McAllister
8 Drive that is located in the bedrock area between the northern boundary of the D-1 Parcel
9 and the McAllister Land Bridge. The Army's activities on the Project Site were not of a
10 nature that would have caused any OE items to penetrate bedrock and the bedrock areas
11 of the Project Site are accordingly considered to be free of OE. Accordingly, it is
12 considered highly unlikely that any OE is present beneath paved areas of the Project Site
13 that have been constructed above bedrock, and institutional controls are not required in
14 such areas.
15

16 **2.8.2 Areas Subject Only to Land Use and Encroachment Prohibitions**

17 It has been determined that institutional controls imposing special OE safety
18 requirements for Excavation Activities are not required in certain areas of the Project Site
19 that had originally been contemplated in the draft Covenant as areas requiring such
20 special requirements. One such area is located in the open space parcels at the western
21 end of the South Valley. No OE or OE Scrap items were located during point clearance
22 activities in this open space area, identified in Figure 2-4 as a "Land Use Covenant and
23 Encroachment Prohibition Area" and in the O&M Agreement as a "Use Restricted
24 Area"(hereafter referred to as a Use Restricted Area), and it is considered highly unlikely
25 that any OE is present. Accordingly, institutional controls imposing special OE safety
26 precautions for Excavation Activities are not required for this open space area.
27

28 The Use Restricted Area at the western end of the South Valley was defined by locating
29 the farthest west OE-Like and OE-Energetic items located during OE clearance, placing a
30 200-foot arc around each and drawing a line north to south connecting the western apex
31 of each arc. PBH will have a land survey prepared using Global Position System (GPS)
32 technology to document GPS coordinates for the subject area so that it can be readily
33 identified if necessary. PBH has installed four steel fence posts across the valley marked
34 with orange reflective tape with directional arrows (arrows point to the next post)
35 engraved into the fence post caps to aid in the identification of the Use Restricted Area.
36

37 While special OE safety precautions for Excavation Activities are not required for the
38 Use Restricted Area at the western end of the South Valley, such area will be subject to
39 the Covenant's restrictions on changes in land use and to the City of Benicia's policy
40 prohibiting the issuance of encroachment permits in open space areas of the Project Site,
41 which policy is further described in Section 3.5 of this O&M Plan.
42

43 Special OE safety precautions for Excavation Activities are also not required for an open
44 space parcel owned by the City on the northern boundary of the Project Site. (See area

on northern boundary of Project Site that is identified on Figure 2-4 as a Land Use Covenant and Encroachment Prohibition Area. and in the O&M Agreement as a "Use Restricted Area" This open space area was included in the Project Site only because the TNT strips (see Figure 1-2 and discussion of TNT remediation in Section 2.4) extended across the boundary between the property owned by PBH and the City-owned property at this location. No OE or OE Scrap items were located during point clearance activities in this area, and it is considered highly unlikely that any OE is present. Accordingly, institutional controls imposing special OE safety precautions for Excavation Activities are not required for this open space area. Like the area in the western end of the South Valley, such area will be subject to the Covenant's restrictions on changes in land use and to the City of Benicia's policy prohibiting the issuance of encroachment permits in open space areas of the Project Site. PBH will have a land survey prepared using GPS technology to document GPS coordinates for the subject area so that it can be readily identified if necessary.

2.8.3 Assessment of Areas Requiring Special OE Safety Precautions for Excavation Activities

For purposes of the Contingency Action Plan, the areas requiring institutional controls imposing special OE safety controls on Excavation Activities have been assigned to one of three categories: "Wetlands Risk Reduction Areas", "OE Construction Support Areas" and "OE Notice Areas". Figure 2-4 identifies the areas assigned to each of these designations.

(a) Wetlands Risk Reduction Areas

During the OE clearance process in the South Valley, it was determined that certain areas in and adjacent to a portion of the wetlands (see Figure 1-2 for location of wetlands) were heavily saturated with metallic materials from the Army's OE demolition activities in the area. The heavy metal content inhibited use of the OE point clearance techniques to clear OE from the area. As described in Section 2.4 above, DTSC approved the use of mechanical excavation of soils in areas with heavy metallic density, so that the soils could be relocated to other areas on the Project Site for OE clearance either by mechanical sifting of the soils or by spreading the soils for scanning and digging of anomalies. Mechanical excavation was used in the areas surrounding the wetlands. However, to minimize impacts to the environmentally sensitive wetlands area, an alternative clearance process was approved for the portion of the wetlands containing high concentrations of metal. (See Revised Wetlands OE Removal Plan, Tourtelot Cleanup Project, Benicia, California (Northgate, May, 2004), which Plan was incorporated into the Final Tourtelot Project Site Ordnance and Explosives Remedial Design Document (Northgate, February, 2002) through Field Change Request No. 36.)

Because the alternative clearance process used for the portion of wetlands with heavy metal saturation may not have located all OE related items for removal, additional risk

reduction measures are required in such areas (Wetlands Risk Reduction Areas). Figure 2-5 shows the Wetlands Risk Reduction Areas. PBH will have a land survey prepared to document GPS coordinates for the Wetlands Risk Reduction Areas subject area so that it can be readily identified if necessary.

The risk reduction measures to minimize the risk of public exposure to any remaining OE items in the Wetlands Risk Reduction Area include (1) planting of spinney or thorny plants or other suitable plant materials in the affected wetland area making access more difficult, (2) posting of signs indicating that the area is an environmentally sensitive wetlands area and that public access is prohibited and (3) imposing a requirement that before any Excavation Activities (as defined in Section 2.5.2) may occur in the Wetlands Risk Reduction Areas the area of the planned Excavation Activities must first be cleared of OE items in accordance with a work plan prepared by a California licensed engineer and approved by DTSC.

The manner in which the requirements described in clause (3) of the preceding paragraph are to be implemented is described more fully in the Contingency Action Plan. PBH has completed the installation of the thorny plants and has planted *Rubus ursinus* (common name, Pacific blackberry).

PBH has also posted signs on both sides of the wetlands reading "Protected Wetlands/Sensitive Habitat/Keep Out". In most locations, the signs are about 100 yards apart, on alternating sides of the wetlands. Two "Protected Wetlands" signs have been placed directly across from each other on each side of the wetlands at both ends of the Wetlands Risk Reduction Area to provide field reference markers to assist in the location of the Wetlands Risk Reduction Area. The tops of the poles on which such signs are mounted have been marked with blue fence post caps. All of the other sign poles within the Wetlands Risk Reduction Area are also marked with blue fence post caps. Outside the Wetlands Risk Reduction Area, the sign poles do not have the blue cap. Annual inspections of the plantings and signs are discussed in Section 3.1 of this O&M Plan.

(b) OE Construction Support Areas

OE Construction Support Areas include (i) the McAllister Land Bridge (other than the Dry Utilities Trench and Wet Utilities Corridor), (ii) the area underlying the Sewer Bench Road, which may contain fill materials potentially containing OE, (iii) the Restricted D-1 Street Area which may be underlain with fill materials potentially containing OE, and (iv) areas in the open space parcels of the Project Site which have suffered landslides, erosion or other soil sloughing after the U.S. Army used the property for demolition activities (Historic Landslide Areas). Such historic activities in the Historic Landslide Areas could potentially have covered OE items with soils to depths exceeding the reliable scanning depth (one foot) of the geophysical instruments used to locate subsurface metallic anomalies during point clearance. Because of the potential that OE might be encountered if Excavation Activities occur in such areas, the Contingency Action Plan

requires that the City require that a military trained OE Technician (Tech 3) observe and provide support for any Excavation Activities that the City authorizes to occur in the OE Construction Support Areas. Additionally, as discussed in Section 2.5.1, should a break in a wet utility line in the Wet Utilities Corridor erode soil to a depth of twelve feet or more below the ground level, the Wet Utilities Blow-Out Area would be treated as an OE Construction Support Area.

Figure 2-4 shows the OE Construction Support Areas. To locate the boundaries of the OE Construction Support Area on the McAllister Land Bridge, personnel in the field can find the Land Bridge Mesh Barrier described in Section 2.6.3 of this O&M Plan. The Mesh Barrier covers the sides of the McAllister Land Bridge which are OE Construction Support Areas. The street portion of the McAllister Land Bridge is also an OE Construction Support Area, except for the Wet Utilities Corridor and Dry Utilities Trench. As discussed in Section 2.6.2 of this O&M Plan, brass pins have been placed in the curb face to mark the location where the Wet Utilities Corridor begins. As described in Section 2.7 of this O&M Plan, the boundaries of the OE Construction Support Areas in the Restricted D-1 Street Area have also been marked with brass pins placed in the curb faces. The paved Sewer Bench Road which is located on the southern slope of the South Valley is an OE Construction Support Area and is readily recognizable in the field because it is a paved surface running through the open space parcels. As discussed in Section 2.8.1 of this O&M Plan, the western end of the South Valley is not subject to the special requirements for Excavation Activities that apply to other open space areas on the Project Site. Likewise, the portion of the Sewer Bench Road located in such area is not an OE Construction Support Area. One of the four fence posts marked with orange reflective tape identified in Section 2.8 of this O&M Plan is adjacent to the Sewer Bench Road to aid in identifying this area in the field.

The Slope Stability and Erosion Monitoring Plan that is attached as Appendix C to this O&M Plan provides additional information regarding the Historic Landslide Areas and Figure C-1 to such Plan shows their locations. As described in such Plan, field inspection stations have been identified as appropriate locations for inspection personnel to view the Historic Landslide Areas during the annual slope stability and erosion monitoring described in Section 3.2 of this O&M Plan. Each field inspection station has been marked in the field so that the location may be found in annual monitoring events to allow for accurate comparison from one year to another. The markers have been installed in the upper 2-foot of soil and consist of a 3/4-inch galvanized pipe set in concrete with an identification number so that it can be easily identified from one year to the next. Each galvanized pipe is brightly colored so that it can be readily located during the monitoring event. GPS coordinates have also been obtained for each marker location (see Table C-2 to the Slope Stability and Erosion Monitoring Plan). Field personnel will be able to use the GPS coordinates in Table C-2 and the visual marker locations to determinate the locations of the Historic Landslide Areas which are OE Construction Support Areas.

1 (c) **OE Notice Areas**

2 All of the remaining Restricted Areas are designated as OE Notice Areas. The Restricted
3 Areas designated as OE Notice Areas have been subjected to two phases of point
4 clearance followed by a Quality Control/Quality Assurance (QC/QA) check or have been
5 cleared of OE using mechanical removal of soils for sifting or for spreading, scanning
6 and digging anomalies to remove OE. The surface areas where mechanical removal of
7 soils occurred have also been subjected to a confirmation geophysical scan to locate and
8 remove any remaining subsurface metallic anomalies, if present. The geophysical
9 equipment used for point clearance and for QC/QA confirmation scanning has been
10 tested at the Project Site and determined to be able to reliably locate 100 percent of
11 subsurface OE items of the characteristic size anticipated to be found at the Project Site
12 to a depth of twelve inches. The geophysical equipment has also been able to detect
13 deeper OE items with a progressively reduced reliability. OE items located on the
14 Project Site have generally been found within twelve inches of the ground surface, with
15 the exception of deeper finds in Historic Landslide Areas, in areas believed to have been
16 used as Demolition Sites by the U.S. Army and in areas where the Army had historically
17 placed fill that may have covered OE items to a depth greater than the twelve inch
18 reliable scanning depth established for the Project Site. (As noted above, Historic
19 Landslide Areas are OE Construction Support Areas.) In Demolition Sites 1 and 3,
20 which are within the Restricted Areas, during OE clearance all soils were excavated to
21 bedrock and replaced with OE free fill. Areas where the Army had historically placed fill
22 are located in future residential areas and have been cleared to a level allowing
23 unrestricted residential use.
24

25 Following the completion of the remedial activities, it is not anticipated that any OE
26 items would remain below the reliable scanning depth in the Restricted Areas designated
27 as OE Notice Areas. As an additional safety precaution, the Contingency Action Plan
28 requires that the City provide information to any persons that the City authorizes to
29 conduct Excavation Activities in OE Notice Areas. The information will warn of the
30 potential that OE items could be encountered and provide information of the action that
31 should be taken should suspected OE items be located. A copy of the OE warning notice
32 is included as Appendix A to the Contingency Action Plan.
33

34 **3.0 MONITORING AND MAINTENANCE REQUIREMENTS**

35
36 Following completion of the remedial activities on the Project Site, operation and
37 maintenance (O&M) activities will be performed to monitor and maintain the
38 effectiveness of the remedial actions. O&M activities include wetlands mitigation
39 monitoring; monitoring of planting and signage to be installed to discourage public entry
40 to Wetlands Risk Reduction Areas; slope stability and erosion monitoring; water
41 monitoring, including surface water, subdrain and seep monitoring; monitoring of the
42 integrity of the Land Bridge Mesh Barrier and monitoring of compliance with the
43 requirements of the institutional controls, including the Covenant and the Contingency

1 Action Plan. Additionally, the City of Benicia is endeavoring to establish a program to
2 place notices through an underground service alert system to notify City of Benicia
3 personnel for the potential of encountering OE during Excavation Activities in the
4 Restricted Areas as a reminder that the safety controls may be applicable. O&M
5 activities also include ongoing educational and informational programs for the public and
6 personnel in the City of Benicia who will be responsible for implementing and
7 overseeing aspects of the Contingency Action Plan. Communication protocols are
8 included in the O&M Plan to provide for periodic reporting to DTSC on the results of the
9 required monitoring and to provide procedures for notifying DTSC of any incident
10 involving ordnance discoveries and notifying DTSC in advance of any Excavation
11 Activities that are planned in OE Construction Support Areas.

12
13 Responsibilities for the monitoring and maintenance activities are assigned to various
14 parties through the O&M Agreement. If the results of the monitoring activities indicate
15 that additional remedial activities and/or changes in the O&M Plan are needed, the
16 responsible entities will make recommendations for such activities or changes in the
17 periodic monitoring reports to DTSC or as otherwise provided by the O&M Agreement.
18 A matrix showing the O&M tasks, responsible entity and schedule for performance and
19 reporting of results to DTSC (Implementation Matrix) is included as Appendix B.

20
21 The following sections describe the O&M activities and monitoring requirements.

22 23 **3.1 WETLANDS MONITORING**

24 25 **3.1.1 Wetlands Mitigation Area**

26
27 Wetlands maintenance and monitoring activities are discussed in the Wetlands Mitigation
28 Plan attached as Appendix C. The Wetlands Mitigation Plan was approved by the
29 USACE in connection with the issuance of a Section 404 permit for filling 0.093 acre of
30 wetlands in the North Valley and 0.122 acre of South Valley seep wetland. As mitigation
31 for the filling of these wetlands, the Wetlands Mitigation Plan provides for the
32 development of mitigation wetlands that will replace the filled areas based on a 2 to 1
33 ratio. The mitigation wetlands will be located in the area shown on Figure 2-5.

34
35 The wetlands should be self sustaining and maintenance free over the long term. Initial
36 maintenance during the first five years after remediation will consist of visual
37 assessments of the wetlands hydrology, soil, and vegetation. The Wetlands Mitigation
38 Plan also discusses contingency measures to be implemented if the wetlands mitigation
39 efforts do not achieve annual or final success criteria.

40 41 **3.1.2 Wetlands Risk Reduction Areas**

42
43 As discussed in Section 2.8.3, in the Wetlands Risk Reduction Areas, thorny plants have
44 been planted adjacent to the wetland area to make access to the wetlands more difficult.

1 The plants will be monitored annually by a contractor retained by PBH for a five year
2 period to confirm that the plants are viable and become well established and self
3 sustaining. If inspections reveal that the plants are not becoming established and self
4 sustaining, measures will be taken to improve their viability or to replace them with other
5 suitable varieties of plants that can adapt better to the conditions while still maintaining a
6 suitable deterrent to public access to the wetlands. It is anticipated that the plants will be
7 self sustaining and maintenance free over the longer term. After the five-year period of
8 monitoring by PBH has been completed, the City will assume responsibility for annual
9 monitoring of the viability of the plants and for any action required to keep the plants
10 viable.

11
12 As also discussed in Section 2.8.3, signs have been erected along the wetlands to
13 discourage the public from entering the sensitive wetlands habitat. On an annual basis,
14 the condition of the signs will be checked. Repairs will be undertaken as needed to keep
15 the signs in good condition.

16 17 **3.2 SLOPE STABILITY AND EROSION MONITORING**

18
19 An erosion assessment and baseline photo study has been conducted in open space
20 portions of the Project Site to identify Historic Landslide Areas where future erosion or
21 landslides could potentially uncover OE items. The results of the study are reported in
22 the Slope Stability and Erosion Monitoring Plan attached as Appendix C. Exhibit C-1 to
23 the Slope Stability and Monitoring Plan shows the locations of the Historic Landslide
24 Areas where future monitoring is required. Table C-2 to the Plan provides GPS
25 coordinates for the monitoring locations. The Plan includes a CD ROM disc containing
26 photographs taken from each monitoring location to document baseline conditions.

27
28 Slope stability and erosion monitoring will be conducted annually to evaluate the stability
29 of the Historic Landslide Areas, including evidence of landslides or erosion. Details of
30 this monitoring plan are described in the Slope Stability and Erosion Monitoring Plan.
31 The Plan describes monitoring measures that will be carried out at the Project Site to
32 assess the state of slope stability and erosion and actions to be taken if signs of slope
33 instability or erosion are observed. The Plan also requires that erosion features or slope
34 instability with the potential to expose OE items be repaired. If such repairs involve
35 Excavation Activities in the Restricted Areas, the repairs must be carried out in full
36 compliance with the requirements of the Contingency Action Plan which sets out the
37 safety requirements applicable to Excavation Activities in the Restricted Areas.

38 39 **3.3 INSPECTION OF LAND BRIDGE MESH BARRIER**

40
41 The Land Bridge Mesh Barrier will be visually inspected annually for the next 30 years
42 during the same schedule as the inspection of slope stability and erosion monitoring. The
43 inspector will look for signs of rust or corrosion that could impair the physical integrity
44 of the barrier. The inspector would also be looking for any indication that the barrier is

not securely staked to the surface of the Land Bridge and for any gap in coverage. Any observed problems would be promptly repaired. Any work to repair or replace the Land Bridge Mesh Barrier would be carried out in full compliance with the requirements of the Contingency Action Plan which sets out the safety requirements applicable to Excavation Activities in the Restricted Areas, including the Land Bridge.

If it becomes necessary for the City of Benicia to repair or replace storm water drain lines installed on the Land Bridge to drain storm water into the wetlands area downstream from the McAllister Land Bridge, it may be necessary to remove temporarily a portion of the Land Bridge Mesh Barrier to gain access to some sections of the drain lines. The Contingency Plan discusses the requirements that would apply if the Barrier is to be temporarily removed to access such drain lines.

3.4 WATER MONITORING

Water monitoring activities will be conducted as part of the O&M Plan for the Project Site, as required by DTSC. Locations of water monitoring activities are shown on Figure 3-1.

In order to verify the effectiveness of the remedial actions, water monitoring at the Project Site will be implemented (surface water, subdrain water, and seeps). The Final Non-Ordinance and Explosives Remedial Design Document Tourtelot Cleanup Project (Northgate Environmental Management, Inc., June 2002)(Non-OE RDD) had anticipated that water monitoring would include monitoring of groundwater, surface water, subdrain water and seeps for a minimum of five years. Based on the results of water monitoring in conjunction with the remediation of the Site, DTSC approved modifying the monitoring program for the Project Site as follows: groundwater monitoring activities are to be curtailed, and seep, subdrain and surface water will be monitored semi-annually for a two year period. Existing monitoring wells (shown on Figure 3-1) will remain in-place in the South Valley during the two year period and until the DTSC approves well closure. Surface water will be monitored at a station located northwest of the McAllister Drive Land Bridge. The two existing seeps will be monitored in the South Valley. (One of the seeps, as a result of remediation activities, will be a subdrain outlet.) The surface water, seeps and subdrain water will be monitored for chemicals of interest identified during the remedial investigation, in accordance with the Non-OE RDD. At the request of DTSC, perchlorate was added to the list of chemicals to be monitored. The subdrains installed in the North Valley during remediation of the Project Site will be monitored at their outlets at either end of the North Valley.

The RI/FS concludes that there is little or no impact to groundwater at the Project Site. Ingestion of groundwater is not considered a complete exposure pathway. Shallow groundwater at the Project Site is not currently used for any purpose, and is not expected to be used in the foreseeable future due to limited groundwater occurrence and low formation permeability that does not yield sufficient quantities of water for drinking or

1 irrigation purposes.

2
3 The RI/FS concludes that surface water in the South Valley is not impacted. Some
4 residual chemicals are present above conservative ecological benchmarks in a limited
5 area of sediment in the South Valley wetlands. No remediation of South Valley wetland
6 sediment was proposed in the RI/FS, the RAP, or the final Site-Wide Post-Remediation
7 Risk Assessment, because the potential benefits of remediating the wetlands to remove
8 residual chemicals in sediments would not justify the disturbance that such remediation
9 would cause to the healthy wetland habitat. No additional sediment sampling is required
10 in the South Valley Wetlands, however, surface water will be monitored for two years, as
11 described below and the health of the wetlands will be assessed after a 5-yr period, in
12 accordance with the Wetlands Mitigation Plan.

13
14 The sections that follow outline the monitoring of surface water, subdrain water, and
15 seeps. O&M work may be modified if conditions or usage of the site change. Such
16 changes will be documented through DTSC approved amendments to the O&M Plan.

17 18 **3.4.1 Surface Water Monitoring**

19
20 Surface water will be monitored in the South Valley wetlands at a location northwest of
21 the McAllister Drive Land Bridge, as shown in Figure 3-1. Surface water will be
22 monitored on a semiannual basis for two years. The surface water monitoring program
23 will be evaluated after two years of semiannual monitoring has been completed.

24 25 26 **3.4.2 Subdrain Monitoring**

27
28 Subdrain water will be monitored at the subdrain outlets, located at the southeast and
29 northwest ends of the North Valley, as shown in Figure 3-1. Subdrain water will be
30 monitored on a semiannual basis for two years. The subdrain monitoring program will be
31 evaluated after two years of semiannual monitoring has been completed.

32 33 **3.4.3 Seep Monitoring**

34
35 Existing seeps in the South Valley will be monitored at the locations shown on Figure 3-
36 1. Seeps will be monitored on a semiannual basis for two years. The seep monitoring
37 program will be evaluated after two years of semiannual monitoring has been completed.

38 39 **3.4.4 Sample Collection; Quality Assurance; Reporting**

40
41 Water samples will be collected and tested and quality assurance protocols implemented
42 in accordance with the applicable provisions of Appendix B (Non-OE Field Sampling
43 and Laboratory Analysis Plan) and Appendix C (Non-OE Quality Assurance Project
44 Plan) of the Non-OE RDD. At the request of DTSC, perchlorate was added to the list of

chemicals to be monitored. Reports containing the monitoring results will be submitted to the DTSC and other appropriate agencies based on the reporting schedule shown in the Implementation Matrix (Appendix A).

3.4.5 Removal of Groundwater Monitoring Wells

In connection with the evaluation of the water monitoring requirements after two years of monitoring, an evaluation shall also be made as to whether existing monitoring wells (shown in Figure 3-1) may be removed. If DTSC approves removal of the monitoring wells, PBH, or its contractor, shall be responsible for removing the wells. Such removal shall be subject to all applicable requirements of this O&M Plan and the Contingency Action Plan relating to Excavation Activities in Restricted Areas. Without limiting the generality of the foregoing, for the monitoring well located on the slope of the McAllister Drive Land Bridge, the requirements for work in OE Construction Support Areas shall be followed.

3.5 MONITORING COMPLIANCE WITH COVENANT AND CONTINGENCY ACTION PLAN

The Covenant prohibits the owner(s) of the Restricted Areas of the Project Site from allowing certain land uses within the Restricted Areas. The City of Benicia presently owns portions of the Restricted Areas and the remaining portions are owned by PBH. The City of Benicia has agreed to accept title to the open space parcels currently owned by PBH following completion of the cleanup activities at the Project Site and certification by the DTSC that remediation is complete at the Project Site and no further removal action/remediation is necessary.

The land uses prohibited in the Restricted Areas include the following:

- (a) a residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation;
- (b) a hospital for humans;
- (c) a public or private school for persons under 21 years of age;
- (d) a day care center for children;
- (e) park activities and facilities of a type requiring construction of equipment or facilities that would require Excavation Activities in Restricted Areas, including, by way of example, tot lots, play lots, playgrounds, playfields and par course equipment;
- (f) camping;

1 (g) construction of any structure (as defined in Section 220-S of the 1998
2 California Building Code, a copy of which attached as Exhibit C to the Covenant)
3 to be used for commercial or industrial purposes; or

4 (h) Excavation Activities [unless performed in accordance with the applicable
5 requirements of the Contingency Action Plan].
6

7 The Covenant provides that an owner of Restricted Areas may not implement land use or
8 zoning changes allowing such prohibited uses without prior notice to and written
9 approval of the DTSC. The Covenant allows the City to deviate from this requirement
10 only if such action is necessary for the City to carry out any legally required action,
11 including (but not limited to) processing ballot initiatives relating to changes in land use
12 or zoning. Under the O&M Agreement, the City is to file an annual report to DTSC to
13 report on compliance with the Covenant. That annual report shall describe any changes
14 that have been implemented with DTSC approval, shall notify DTSC of any changes that
15 the City determined that it was legally required to implement without an opportunity to
16 obtain DTSC's prior approval and shall confirm that, except for such changes, no land
17 use or zoning changes affecting the Restricted Areas have occurred.
18

19 The Covenant also sets out the procedures to be followed whenever Excavation Activities
20 are proposed to be conducted in the Restricted Areas. The Covenant requires a
21 Contingency Action Plan, which describes the review and approval process that the City
22 of Benicia will follow to authorize City employees or third parties to conduct Excavation
23 Activities in Restricted Areas. The City's annual written report to DTSC will report on
24 the approvals processed by the City to allow Excavation Activities and will notify DTSC
25 of the nature and scope of the Excavation Activities that occur pursuant to such
26 approvals. The information to be included in such reports is described in the
27 Contingency Action Plan.
28

29 The City of Benicia has adopted a policy that prohibits encroachments on City owned
30 land within the Project Site. The policy prohibits the issuance of encroachment permits
31 that would allow residents in areas adjacent to the Project Site to conduct Excavation
32 Activities in open space areas on the Project Site. The policy requires that the City staff
33 monitor for prohibited encroachments and take appropriate follow up action. If the City
34 learns of unauthorized Excavation Activities in Restricted Areas, the City will take
35 prompt corrective action pursuant to the then applicable enforcement provisions of Title
36 12, Chapter 12.12 of the Benicia Municipal Code. The City's annual written report to
37 DTSC will report on any known Excavation Activities that have occurred in Restricted
38 Areas without being processed through the City's approval process (as described in the
39 Contingency Action Plan) and will describe the corrective action that has been taken.
40

41 **3.6 UNDERGROUND SERVICE ALERTS**

42

43 The City of Benicia's City Engineer has met with representatives of Underground Service

Alert (US Alert) to discuss the possibility of establishing a program which would allow US Alert to provide special notice to the City of Benicia when US Alert is notified of proposed excavation activities in any of the Restricted Areas. US Alert is a nonprofit organization that operates in Northern California and other locations. Its purpose is to receive planned excavation reports from public and private excavators and to transmit those planned excavation reports to all participating members of US Alert who may have underground facilities at the location of proposed excavation. The City of Benicia is a member of US Alert and eligible to receive such notifications of planned excavations. US Alert has expressed interest in establishing the special notice program for the City of Benicia, but doing so will require approval of the Board of Directors of US Alert and the establishment of appropriate operating procedures. The Contingency Action Plan describes how it is currently anticipated that the underground service alert procedures would be implemented, provided that the US Alert Board approves the program.

3.7 PUBLIC AWARENESS PROGRAMS

As part of the USACE's separate project to remove OE and remediate chemically affected soils and water in other portions of the former Benicia Arsenal, USACE is establishing a public awareness program to educate and inform the public of the potential for encountering OE items on the former Benicia Arsenal and the dangers associated with OE. USACE's educational program will relate to all areas within the former Benicia Arsenal, including the Project Site. The program is expected to include (1) educational programs, (2) distribution of pamphlets and brochures and (3) an OE safety awareness training video that the City of Benicia can utilize as a training device for its Police and Fire Departments. The USACE is not a party to the O&M Agreement, but has confirmed to the City of Benicia that it will assist the City in developing the educational materials required to implement the public awareness programs described in this Section 3.7. Through the O&M Agreement, the City of Benicia agrees to maintain the public awareness programs and provide the necessary training on an annual basis until it is determined by DTSC that the program is not necessary.

3.7.1 Educational Programs. An educated public is more likely to make prudent decisions if OE items are encountered. Educational programs targeted towards elementary and middle school age children in Benicia will inform students of the potential presence of OE on the former Benicia Arsenal and how to respond if OE items are encountered. School aged children are also able to inform adults by providing information learned from the educational programs to their parents and relatives.

During the 2002-2003 school year, the USACE visited all of the Benicia elementary schools to make presentations. Some elementary schools were also visited again in the 2003-2004 school year. Participants were made aware of the potential presence of OE on the former Benicia Arsenal and how to recognize potentially dangerous items. The basic message stressed the importance of immediately vacating any area in which potential ordnance items are encountered and of reporting the discovery to a responsible adult.

1 USACE has indicated that as part of its operations and maintenance program for the
2 Benicia Arsenal, USACE expects to establish a program for providing similar
3 presentations in the future to all Benicia Elementary schools on a two year cycle.
4

5 It is also anticipated that as part of its operations and maintenance program for the
6 Benicia Arsenal, the USACE will assist the Camel Barn Museum in developing a
7 permanent educational display and related materials that can be used to acquaint students
8 who visit the museum on school field trips of the potential for encountering OE on the
9 former Benicia Arsenal and how to respond. The Camel Barn Museum already includes
10 displays to acquaint visitors with the history of the U.S. Army's use of the former Benicia
11 Arsenal. The new educational displays will include posters and photographs of ordnance
12 items located during the USACE's OE removal activities on the former Benicia Arsenal.
13

14 It is also anticipated that the USACE will work with museum personnel to develop an
15 educational program that can be presented by museum staff or volunteers to school
16 children who take field trips to the museum. The Benicia School Board will be
17 encouraged to make visits to the Camel Barn Museum a recurring part of the school
18 curriculum. During the educational presentations by Museum staff to visiting students, it
19 is anticipated that students would be provided with handouts explaining the risks of
20 encountering OE on the former Benicia Arsenal and reinforcing the message that any
21 contact with a suspect item must be avoided and should be immediately reported to a
22 parent, teacher or other responsible adult. Students would be encouraged to share
23 information with parents, causing the network of information to be expanded.
24

25 The details of the USACE's educational program will be refined and finalized as part of
26 the operations and maintenance component of the USACE's remediation of the former
27 Benicia Arsenal.
28

29 **3.7.2 Printed Media Awareness Program.** Through the use of printed media,
30 Benicia residents and businesses can be informed about the existence of OE hazards
31 within the former Benicia Arsenal. USACE has developed a brochure with text and
32 graphics which describe how to identify OE, safety procedures associated with the proper
33 avoidance/reporting of ordnance items, instructions for dealing with OE if encountered
34 and telephone numbers to contact if potential OE is encountered or if questions need to
35 be answered. PBH will provide for the initial preparation of 30,000 copies of the
36 brochure and will provide copies of the brochure to the City. PBH will also arrange for
37 the brochure to be made available to the City of Benicia in electronic format for future
38 additional printing. The City of Benicia owns the facilities that provide water to
39 residences and businesses in Benicia. At least annually, the City of Benicia will include a
40 copy of the educational brochure as an insert to the water bills sent to residences and
41 businesses. It is anticipated that USACE will provide the brochure, or other appropriate
42 public awareness materials, to the Camel Barn Museum and schools in the City of
43 Benicia as part of the USACE's operations and maintenance program for the former
44 Benicia Arsenal.

1
2 **3.7.3 Training Video.** USACE has prepared a video presentation that has been
3 provided to the City of Benicia to be used to train personnel in Benicia's Police
4 Department and Fire Department of proper procedures for handling potential OE
5 discoveries. The City of Benicia will include such training as part of its annual training
6 programs for members of the Police and Fire Department.
7

8 **3.7.4 Training of City Personnel.** The Contingency Action Plan describes the
9 training program that will be developed to provide periodic training for City of Benicia
10 personnel who may be involved in planning or conducting Excavation Activities in
11 Restricted Areas. Copies of the training materials to be used for the annual training are
12 included in Appendix C to the Contingency Action Plan.
13

14 **4.0 REPORTING; COMMUNICATIONS**

15

16 Monitoring reports for the various activities required under the O&M Plan will be
17 periodically submitted to DTSC. The schedule for submittal of the monitoring reports
18 and the parties responsible for preparing the reports are set out in the Implementation
19 Matrix (Appendix B). The City's annual reports will be submitted in the form described
20 in the Tourtelot Project Annual Inspection and Report Form attached as Appendix D.
21 Copies of the monitoring reports will be provided to DTSC, the City of Benicia and PBH.
22

23 The Contingency Action Plan includes a standard operating procedure to be followed to
24 notify DTSC and USACE of any incident on the Project Site involving ordnance
25 discoveries.
26

27 **5.0 FIVE YEAR REVIEW**

28

29 At the end of every five year interval following the date of the O&M Agreement (Five
30 Year Review Period), the O&M Agreement requires that each entity identified on the
31 Implementation Matrix (Appendix B) will submit a report to DTSC evaluating the
32 success of the various monitoring activities for which the entity is responsible. The
33 report will include the responsible entity's recommendations as to the modification
34 and/or termination of any monitoring requirements. Any such modification and/or
35 termination of monitoring requirements shall require DTSC approval. The City's five
36 year reports will be submitted in the form described in the Five Year Inspection and
37 Wrap-Up Report, attached as Appendix E.
38

39 **6.0 REFERENCES**

40

41 Department of Toxic Substances Control. Draft Environmental Impact Report, Tourtelot
42 Remediation/Cleanup Project, Benicia, California (September, 2001)
43

44 EarthTech, Inc. Final Remedial Investigation/Feasibility Study, Tourtelot Cleanup

1 Project, Benicia, California (July 2001)

2
3 Earth Tech, Inc. Final Remedial Action Plan Tourtelot Cleanup Project, Benicia,
4 California (September 2001)

5
6 Northgate Environmental Management, Inc. Final Non-Ordnance and Explosives
7 Remedial Design Document Tourtelot Cleanup Project (June 2002)

8
9 Northgate Environmental Management, Inc. Final Tourtelot Project Site Ordnance and
10 Explosives Remedial Design Document (Northgate, February, 2002) (OE RDD)

11
12 Northgate Environmental Management, Inc. Final Conceptual Site Model, Tourtelot
13 Cleanup Project, Benicia, California (June 2004)

14
15 Northgate Environmental Management, Inc. Proposed Wetlands OE Removal Plan,
16 Tourtelot Cleanup Project, Benicia, California (May, 2004), which Plan was incorporated
17 into the OE RDD through Field Change Request No. 36.
18

Figure 1-1 Regional Site Location

Figure 1-2 Project Site Layout

Figure 1-3 Future Land Use

Figure 2-1 Figure showing location of Land Bridge on the Project Site. The Figure also identifies the location of Dry Utilities Trench and Wet Utilities Corridor on the Land Bridge and the area where the Land Bridge Mesh Barrier is Located

Figure 2-2 Figure Showing Cross Section of Wet Utilities Corridor and Dry Utilities Trench on Unpaved Portion of McAllister Land Bridge

Figure 2-3 Figure showing paved locations on Project Site. Figure identifies existing paved areas on the Project Site where no institutional controls exist and the areas on McAllister Drive that are subject to institutional controls.

Figure 2-4 Figure showing open space areas that will be free of institutional controls and identifying areas in open space that have been designated as OE Construction Support Areas, OE Notice Areas and Wetlands Risk Reduction Areas

Figure 2-5 Figure showing Wetlands Risk Reduction Areas and Wetlands Remediation Area

Figure 3-1 Water Monitoring Sampling Locations

APPENDIX A IMPLEMENTATION MATRIX

APPENDIX B WETLANDS MITIGATION PLAN

APPENDIX C SLOPE STABILITY AND EROSION MONITORING PLAN

APPENDIX D TOURTELOT PROJECT ANNUAL INSPECTION AND REPORT FORM

APPENDIX E FIVE YEAR INSPECTION AND WRAP UP REPORT FORM